Bendix® QR-N™ Quick Release Valve

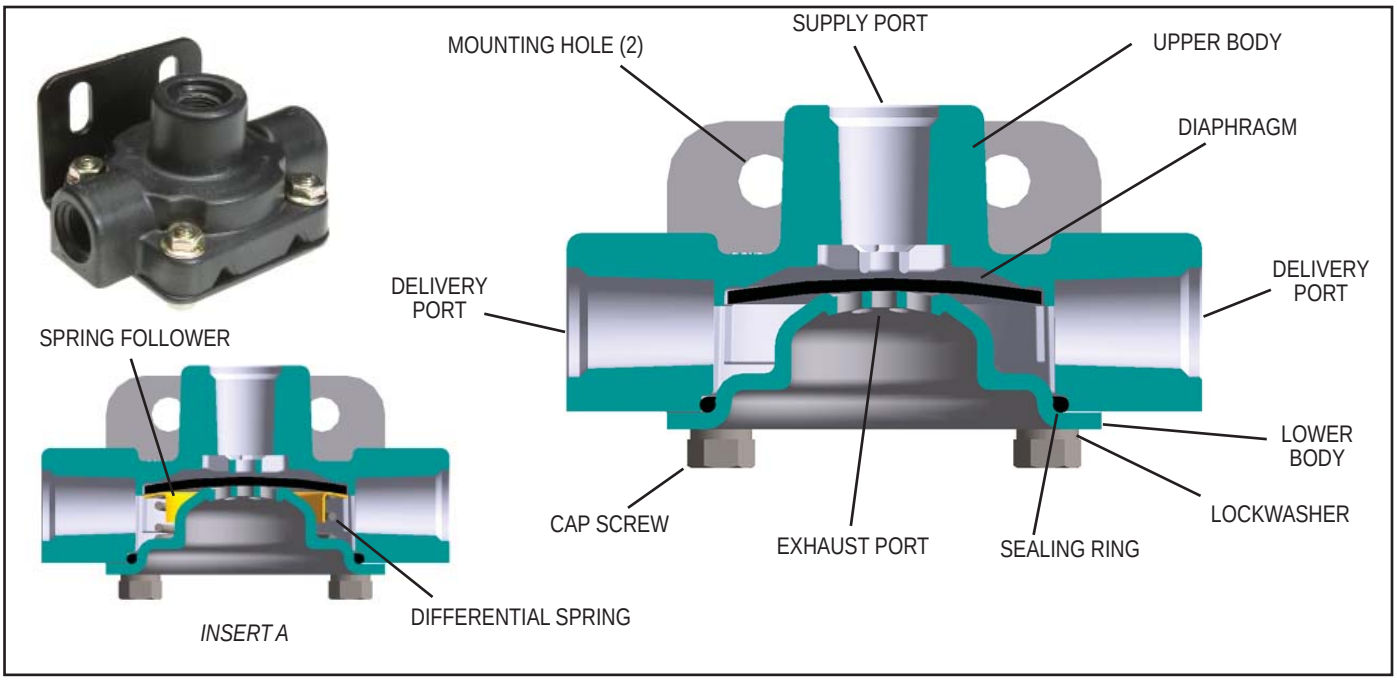

FIGURE 1

DESCRIPTION

The function of the Bendix® QR-N™ quick release valve is to "speed up" the exhaust of air from the actuators it serves. It is generally mounted on the vehicle axle midway between the two actuators connected to it.

In the standard (Refer to Figure 1) QR-N™ valve a flat circular diaphragm is installed between the nonmetallic upper body and stamped steel lower body. An o-ring seals the two body halves which are held together using four 1/4" machine screws and flange nuts.

In its standard configuration the QR-N™ valve is supplied with a 1 psi (6.9 kPa) maximum differential. For example with supply pressure at 10 psi (68.9 kPa) delivery pressure is 9 psi (61.8 kPa). Higher differential pressures are available for special applications and are obtained by the addition of a spring and diaphragm follower to the standard QR-N™ valve (Refer to Insert A).

Various pipe thread sizes are available for the single supply port and two delivery ports of the QR-N™ valve. QR-N™ valve mounting is accomplished via two 11/32" diameter holes on 1-1/2" centers.

OPERATION

With no air pressure applied to the QR-N™ valve (Refer to Figure 1), the diaphragm is slightly flexed by the upper and lower body. In this condition the center portion of the diaphragm rests on the exhaust port in the lower body while the outer edge and opposite side of the diaphragm rests against the sealing lip of the upper body.

APPLY

Air entering the supply port of the QR-N™ valve causes the center portion of the diaphragm to seal the exhaust port. Simultaneously, the outer edge of the diaphragm moves away from the sealing lip of the upper body allowing air to flow from the supply port out the delivery ports.

BALANCE

When air pressure on both sides of the diaphragm is approximately equal (1 psi differential), the natural resiliency of the diaphragm material causes the outer edge of the diaphragm to move into contact with the upper body sealing lip. The QR-N™ valve exhaust remains sealed because air pressure bears against the center portion of the diaphragm from one side only.

RELEASE

When air pressure is reduced or removed from the QR-N™ valve supply port, the air pressure on the delivery side of the diaphragm is greater than that on the supply side. The higher delivery side pressure holds the outer edge of the diaphragm against the upper body sealing lip while simultaneously moving the center portion away from the exhaust port. Air from the delivery ports flows out the exhaust. When air pressure on the delivery side of the diaphragm equals the pressure on the supply side, the center portion of the diaphragm moves into contact with the exhaust port.

PREVENTIVE MAINTENANCE

Important: Review the Bendix Warranty Policy before performing any intrusive maintenance procedures. A warranty may be voided if intrusive maintenance is performed during the warranty period.

No two vehicles operate under identical conditions, as a result, maintenance intervals may vary. Experience is a valuable guide in determining the best maintenance interval for air brake system components. At a minimum, the QR-N™ valve should be inspected every 12 months or 3600 operating hours, whichever comes first, for proper operation. Should the QR-N™ valve not meet the elements of the operational tests noted in this document, further investigation and service of the valve may be required.

GENERAL SAFETY GUIDELINES

WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following general precautions should be observed at all times.

1. **Park the vehicle on a level surface, apply the parking brakes, and always block the wheels. Always wear safety glasses.**
2. **Stop the engine and remove ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, EXTREME CAUTION should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components.**
3. **Do not attempt to install, remove, disassemble or assemble a component until you have read and thoroughly understand the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.**
4. **If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with an AD-IS® air dryer system or a dryer reservoir module, be sure to drain the purge reservoir.**
5. **Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.**
6. **Never exceed manufacturer's recommended pressures.**
7. **Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.**
8. **Use only genuine Bendix® replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.**
9. **Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.**
10. **Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.**
11. **For vehicles with Antilock Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.**

OPERATING AND LEAKAGE TESTS

1. Apply 100 psi (689 kPa) air pressure to the supply port of the QR-N™ valve and note that the device connected to the QR-N™ valve responds promptly.
2. With 100 psi (689 kPa) air pressure applied to the QR-N™ valve SUPPLY port apply a soap solution to the exhaust port and around the junction of the upper and lower body halves.
   A. No leakage is permitted between the body halves.
   B. Leakage of greater than a 1" (25.4 mm) bubble in 3 seconds at the exhaust port is unacceptable.
3. Release the air pressure at the supply port and note that the device connected to the QR-N™ valve responds promptly and returns to a zero air pressure condition.

4. If the QR-N™ valve does not function as described or if leakage is excessive, it is recommended that it be replaced with a new or remanufactured unit or repaired using a genuine Bendix maintenance kit.
5. Use only genuine Bendix replacement parts and components.
   A. Only components, devices, mounting and attaching hardware specifically designed should be used.
   B. Replacement hardware, tubing, hose, fittings, etc. should be of equivalent size, type, length, and strength as the original equipment.
   C. Make certain that when replacing tubing or hose, all supports, clamps or suspending devices that were originally installed by the vehicle manufacturer are reinstalled.
6. Devices with stripped threads or damaged parts should be replaced. Repairs requiring machining should not be attempted.

REMOVING THE QR-N™ VALVE

1. Park the vehicle on a level surface. Block the wheels and/or hold the vehicle by means other than the air brakes.
2. Drain all air brake system reservoirs.
3. Identify, mark and disconnect all air lines from the valve.
4. Remove all tubing or hose fittings from the valve.
5. Remove the valve mounting hardware and the valve.

DISASSEMBLY

The following disassembly procedure is provided as a reference. Before disassembling the QR-N™ valve, a Bendix maintenance kit or genuine replacement parts should be available.

1. Remove the four 1/4" flange nuts and bolts that secure the upper and lower body halves. NOTE: Before removing the last two nuts and bolts completely, check the opening between the body halves to determine if the QR-N™ valve has a differential spring installed. If so, a light spring load should be anticipated and can be easily controlled by manually holding the body halves together.
2. Separate the body halves and remove the diaphragm (and diaphragm follower and spring if so equipped).
3. Remove the sealing ring between the body halves.

CLEANING & INSPECTION

1. Clean the upper and lower body halves; also diaphragm follower and spring (if applicable) in mineral spirits. Do not immerse nonmetallic components for a prolonged period of time (no more than 10 minutes). Dry all parts thoroughly.
2. It is recommended that the diaphragm and sealing ring be replaced after disassembly.
3. Inspect the upper body for galled threads and cracks. If found, the entire QR-N™ valve should be replaced.
4. Inspect the interior valve portion of the lower body for heavy corrosion and pitting. If found, replace the entire QR-N™ valve assembly.
5. If applicable, inspect the diaphragm follower and spring for any corrosion and pitting, replace if necessary.

ASSEMBLY

1. Place the supply port of the upper body down on a clean, level work surface. Install the flat circular diaphragm in the upper body making certain it is CENTERED.
2. If applicable, install and center the diaphragm follower with its flat flange side against the diaphragm. Install the spring on the diaphragm follower.
3. Install the sealing ring on the lower body and carefully install the lower body on the upper body. Make certain that the diaphragm remains centered in the upper body and the sealing ring enters its groove in the upper body.
4. Install the four 1/4" flange nuts and bolts and torque to 60 inch pounds (6.78 N.M).

INSTALLING THE QR-N™ VALVE

1. Mount the QR-N™ valve on the vehicle.
2. Install the tubing or hose fittings in the upper body of the QR-N™ valve. If a thread sealant is used, make certain that this material will not enter the valve during use. IMPORTANT: WHEN INSTALLING FITTINGS, DO NOT TORQUE BEYOND THE FOLLOWING OR DAMAGE TO THE UPPER BODY MAY RESULT:

   12 ft. lbs. (16.3 N.M) for the supply port

   10 ft. lbs. (13.6 N.M) for the delivery ports

   (or 2-1/2 turns beyond finger tight for each.)
3. Connect the air lines to the QR-N™ valve as identified in Step 4 of "Removing the QR-N™ Valve".
4. Perform the “Operating and Leakage Tests” before placing the vehicle in service.

BW1586 © 2007 Bendix Commercial Vehicle Systems LLC All rights reserved. 9/2007 Printed in U.S.A.